# Graduate unemployment in the South African mining sector: a case study of mining graduates of the University of Johannesburg

T. Mmola, M. Mpanza, and P. Nelwamondo

University of Johannesburg

A sustainable economy is characterized by, among other factors, its ability to generate employment opportunities. Economic factors such as stagnant global financial markets and subdued demand for mineral commodities are affecting the growth prospects of mining businesses domestically, which has a direct effect on the ability of mining companies to absorb labour including recent mining engineering graduates. This study investigated the activities of mining graduates from the University of Johannesburg (UJ) since their graduation and their employment prospects, and how quickly they have been absorbed into the labour market. It was found that that one-third of mining graduates from the UJ are unemployed and that the median time to find employment was within 6 months of graduation. Graduates perceive the lack of employment opportunities in their field of study as the main reason for unemployment.

## INTRODUCTION

A sustainable economy is characterized by, among other factors, its ability to generate employment opportunities. The African Union (AU) recognizes this important fact and declares, through its Agenda 2063 framework document (African Union Commission, 2015) that by 2063 youth unemployment in Africa will be eliminated. The AU recognizes that for Africa to prosper, the continent needs well educated citizens who can participate in a skills revolution underpinned by science, technology and innovation. Inclusive growth and sustainable development on the continent relies on economies that can create decent jobs and economic opportunities for all (African Union Commission, 2015).

South Africa's ability to create shared growth and sustainable development is undermined by the economy's low capacity to absorb labour. Unemployment remains the country's most significant socio-economic problem. The International Labour Organization (ILO) announced that South Africa's unemployment rate will slip to the sixth highest in the world by 2020, down from its current position at eighth highest. The ILO also predicts a downgrading of the South African economy in the same period (International Labour Organization, 2015). Unemployment in South Africa is attributed to the economic policies that impede rather than support efforts to increase the rate of job creation (Soko & Balchin, 2014). However, South Africa's National Development Plan aims to reduce the unemployment rate from 25% in June 2012 to 14% by 2020 and to 6% by 2030 (National Planning Commission, 2011).

The unemployment rate amongst youth is more than twice that of adults (StatsSA, 2008). The South African government has invested significant effort in a national youth development strategy to ensure that the youth have an opportunity to participate fully in the South African economy and society (Mayer, 2011). Despite this investment, youth unemployment has been on the rise since the global financial crisis of mid-2008. In a skill-intensive economy, tertiary education is increasingly important for youth in facilitating a move into employment.

Most of the published studies on graduate unemployment have investigated this phenomenon at the faculty level such as law, engineering, the humanities *etc*. This study examined graduate unemployment at a discipline-specific level, focusing on mining engineering because the mining sector is one of the major employers in South Africa. It is estimated that the mining sector alone contributes about 8–15% of the total employment in South Africa (Chamber of Mines, 2015).

Mining engineering qualifications in South Africa are offered by the University of Johannesburg (UJ), the University of Pretoria (UP), the University of South Africa (UNISA) and the University of the Witwatersrand (Wits). This paper presents a case study of the employment prospects of UJ's mining engineering students since their graduation. The School of Mining, Metallurgy, and Chemical Engineering (SMMCE) at UJ offers two academic programmes in mining engineering; the National Diploma (ND), which is a 3-year full-time programme, and the Bachelor of Technology (B. Tech) degree, which is 4-year full-time programme.

The aim of this paper is to create awareness and inform mining sector stakeholders of the status of graduate unemployment; to create a discourse on the main causes of graduate unemployment in the mining sector; and explore possible ways in which graduates can become resilient in times of high unemployment.

## LITERATURE REVIEW

Global economic factors such as stagnant financial markets and subdued demand for mineral commodities are affecting the growth prospects of mining businesses, which has a direct effect on their ability to absorb labour including recent mining graduates. It is important to define the term graduate unemployment and then to review the prevalence of graduate unemployment in South Africa and specifically graduate unemployment in the South African mining sector.

### Defining Graduate Unemployment

The definition of graduate unemployment is best understood when the two terms graduate and unemployment are examined separately. In the literature there are various definitions for the term graduate (Baldry, 2013). The definition of a graduate may be as broad as people with higher education (Moleke, 2003) or as general as students who have graduated (Letseka *et al.,* 2010). Altbeker and Storme (2013) make a clear distinction between graduate and diplomats where a graduate refers solely to holders of a bachelor's degree or a higher degree from a university and diplomats are holders of other tertiary qualifications. In this paper, the term graduate refers to an individual who holds any formal tertiary qualification. A person is unemployed if he or she desires employment but cannot find a job. The unemployment rate is the number of people actively looking for a job as a percentage of the labour force (StatsSA, 2008). Therefore, graduate unemployment refers to the number of people who hold any formal tertiary qualification who desire employment but cannot find a job.

### Prevalence of Graduate Unemployment in South Africa

According to van Broekhuizen and van der Berg (2013), 57.9% of the South African labour force has completed education at a tertiary level. This implies that the size of the graduate labour force is increasing in accordance with the structural change in demand for high-skilled workers. This view is supported by the findings of the Centre for Development and Enterprise (CDE), that the number of degree holders in the labour market grew from 463 000 in 1995 to 1.1 million in 2011. The CDE conducted a study that concludes that graduate unemployment is a much-exaggerated problem in South Africa and that few people with university degrees are unemployed—just under 5% in 2011 (Altbeker and Storme, 2013). However, Baldry (2013) states that while graduate unemployment is relatively small when compared to the general population, the unemployment rate of those with tertiary education is rising faster than among those with lower education.

**South African Mining Graduates' Employment Outlook**

The mining industry is an important employer of youth in South Africa. Graduate employment is influenced by firstly, the number of job openings requiring tertiary education and secondly, the number of graduates entering the job market (Moleke 2005). The number of mining graduates entering the South African labour market is increasing year-on-year (Musingwini, *et al.*, 2012; Rupprecht *et al.*, 2015). However Phillips (2015) notes with concern that after decades of undersupply, graduates are now struggling to find employment. Rupprecht *et al.* (2015) have observed that some mining companies are no longer absorbing graduates that they supported through bursaries during their undergraduate studies. A study by Pauw *et al.* (2006) found that the general sentiment amongst South African mining companies is that the domestic mining industry is unlikely to grow in the future. With an industry that is at best stable but potentially in decline, it seems that mining will contribute progressively less to employment in South Africa.

Mining skills are portable and employment opportunities can be pursued outside of South Africa (Musingwini *et al.*, 2012). Graduates in particular are more mobile than those with less education (Moleke, 2005). Mining graduates may choose to explore work opportunities in other African countries or further abroad. The Southern African Institute of Mining and Metallurgy (SAIMM) is well placed to support the industry by providing a vocational home to the technical disciplines in mining and facilitating graduate mobility through its network and links with the SADC countries (van der Merwe, 2011).

The South African mining industry needs to look at graduates from a strategic perspective. Instead of employing young graduates only in production posts, industry could benefit from their technical training in specialized fields such as mine planning, rock engineering, mine ventilation, research and development, plant optimization, project management, and mechanization (Stacey *et al*., 2009).

## RESEARCH FOCUS AND METHODOLOGY

The research followed a survey design. Questionnaires were used for data collection. The research group was selected from graduates who graduated in 2011, 2012, 2013, 2014 and 2015. The study is considering the recent five-year period, due to easy access of data and students contact details are well documented for the aforementioned period.

The bulk of the questionnaire consisted of closed-ended questions. The questionnaire was divided into three basic sections:

- Section A: Biographical questions;
- Section B: Questions about graduates' experience during their university studies;
- Section C: Questions about graduates' experience after completing their university studies (and this include their employment status).

This paper reports on key findings from Sections A and C, which probe the graduates experience in the job market. Section B lies outside the scope of this paper as it focuses on the graduates' experience during their university studies.

The e-mail addresses of the graduates in the target group were extracted from the official University of Johannesburg (UJ) database. The questionnaire was placed on an external server and all responses were recorded on a database created by an external consultant. A request to complete the questionnaire by clicking on an embedded link was e-mailed to all the graduates for whom the e-mail addresses were available. Some students that should have been part of the research group were not recorded on the UJ database, or their e-mail addresses were out of date, and no invitation to participate could be sent to them. Participating in the survey was voluntary, and all potential respondents were assured of anonymity.

## DATA ANALYSIS AND DISCUSSION

A total of 54 fully completed, usable questionnaires were received by the cut-off date. The presentation of the data analysis follows the method used by UJ's Division of Institutional Planning, Evaluation and Monitoring.

**Biographical Questions**
In this section the respondents' biographical information is analysed and discussed. The biographical questions focused on age, gender and ethnic group.

***Age***
The respondents were requested to indicate their age last birthday. The information obtained is shown in Table I. First-time job seekers (the identified research group) will be mainly from the 20–29 age group. Younger graduates are more likely to be unemployed than older graduates mainly due to the lack of work experience. Mining companies may perceive younger graduates as not being work ready and requiring considerable time and financial investment in terms of training. Internship programmes may be longer than 3 years before a graduate can be deemed to be in a position to add real value to the company.

*Table I. Age of respondents at last birthday*

| Age (years) | Number of respondents | % |
|---|---|---|
| 20 - 24 | 21 | 42.9 |
| 25 - 29 | 21 | 42.9 |
| 30 - 34 | 7 | 14.3 |
| **Total** | **49*** | **100** |

* Not all respondents completed this question

***Gender***
The gender distribution of the research group is shown in Table II.

*Table II. Gender distribution of the research group*

| Age (in years) | Number of respondents | % |
|---|---|---|
| Male | 35 | 64.8 |
| Female | 19 | 35.2 |
| **Total** | **54** | **100** |

Male respondents are in the majority of graduates. Over the five-year period (2011-2015) more males than females have enrolled for the ND programme at UJ. Furthermore, the annual number of females enrolling into the ND programme has decreased from 30 in 2011 to 24 in 2015. Historically mining has been a male dominated industry and the decline in females enrolling to the programme does not bode well for transformation of the industry.

***South African Ethnic Group***
Respondents were asked to declare their citizenship status. 94% of all respondents were South African citizens and 6% non-South African. Respondents who indicated that they are South African citizens/have permanent residency in South Africa were asked to indicate which South African ethnic group would describe them best. The information in Table III was obtained.

*Table III. South African ethnic group.*

| Ethnic group | Number of respondents | % |
|---|---|---|
| African/Black | 49 | 96 |
| Coloured | 0 | 0 |
| Indian/Asian | 0 | 0 |
| White | 2 | 4 |
| Do not want to indicate | 0 | 0 |
| International | 0 | 0 |
| **Total** | **51*** | **100** |

* Not all respondents completed this question

The data indicates that African/black students are in the majority. This can be expected since the enrolment figures of non-black students in the SMMCE has declined over the years. Generally, the SMMCE has attracted mainly high school learners from historically disadvantaged schools. The current composition of UJ mining graduates is not representative of the South Africa's ethnic demographics. Studies by the CDE (Altbeker and Storme, 2013) indicate that at 6.7% unemployment rate, black graduates are somewhat more likely to be unemployed than white graduates (2%).

***Summary of Biographical Information***

The total research group, consisting of mining engineering graduates of the SMMCE from 2011 - 2015 shows the following characteristics

- The group consists of National Diploma and B. Tech degree graduates
- The majority are younger than 30 years of age
- The majority are males
- The majority are South African citizens
- In terms of ethnic grouping, the majority are Black Africans from South Africa

**Experience after graduation**

In this section, information about the research group's experiences of finding employment after graduation was acquired. The following questions were included:

***Highest qualification***

The respondents were requested to indicate the most recent qualification that was awarded to them by UJ. The responses are summarized in Figure 1.

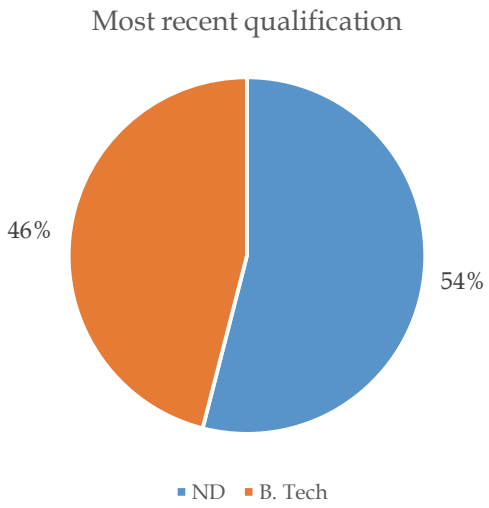


*Figure 1. Most recent qualification.*

Several authors (Moleke, 2005; Altbeker and Storme, 2013; Baldry, 2013) have considered whether the type of qualification held is a factor in the employability of graduates. Figure 2 compares the employment status of recent graduates with the two academic qualifications offered by the SMMCE at UJ i.e. the ND and B. Tech degree.

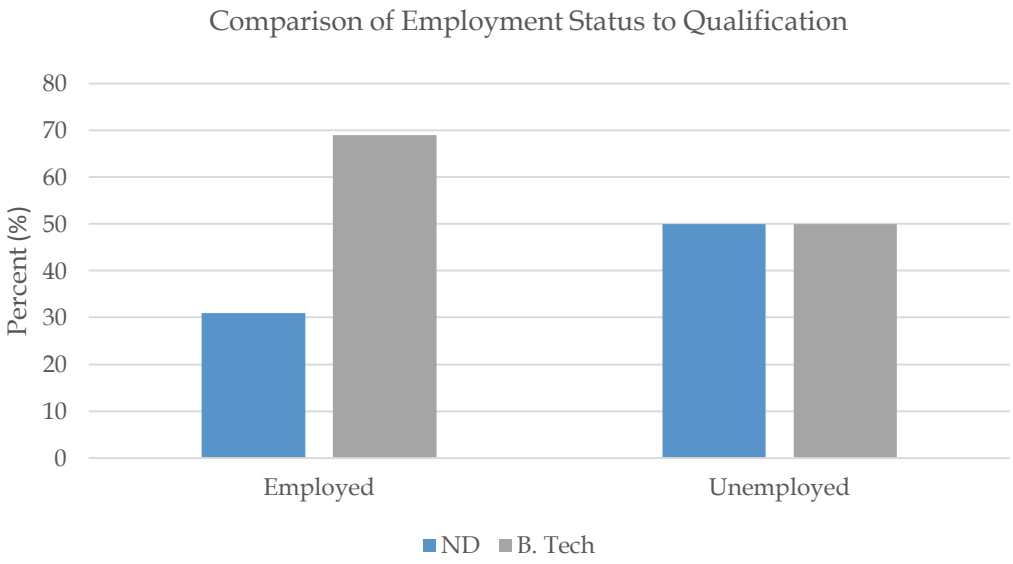


*Figure 2. Comparison of employment status to qualification*

From the unemployed respondents there is an equal split of ND graduates and B. Tech graduates. Out of the respondents who are employed, 31% are ND graduates and 69% are B. Tech graduates. It thus seems that a 4-year B. Tech qualification does provide the employment seeker with some advantage over the 3-year ND graduate in securing full-time employment.

***Current Employment Status***

The responses to the question 'What is your current employment status?' are summarized in Figure 3.

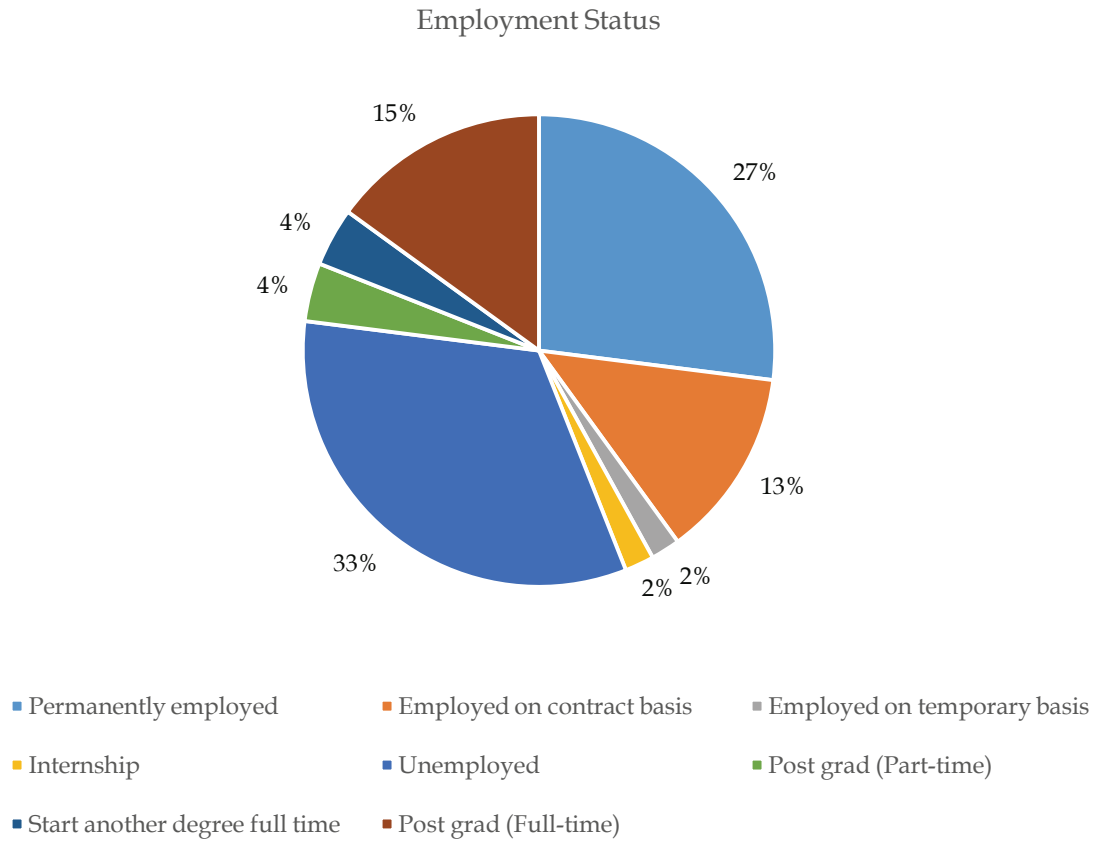


*Figure 3. Summary of graduates' employment status*

44% of respondents had found employment. 27% of the respondents were permanently employed, with the remaining employed respondents being on a temporary basis, contract basis, or in an internship. This study could not reveal whether all those graduates who eventually find employment, find it in the mining industry or in other industries. Further research of the aforementioned aspect is still to be conducted however, according to Chamber of Mines CEO Roger Baxter, the South African mining industry has a retention rate of just 15% with most graduates eventually moving into other fields (Davenport, 2015).

23% of the respondents were furthering their studies on either a part-time or full-time basis. Due to the characteristics of the population under study, i.e. UJ mining engineering graduates with ND or B. Tech qualifications the study does not determine whether there is an advantage to the first-time job seeker in holding a postgraduate qualification such as a Master's or Doctoral degree. It would be insightful to investigate whether there is a need and the extent of the demand for postgraduate qualifications in the mining sector. This will allow the mining sector to define its position within a knowledge economy. Wits, UP and UJ are on a postgraduate research drive to supply the mining industry with professionals that can generate the ideas and initiatives needed to overcome a number of the technical challenges facing the mining industry. Government as well recognises the need for postgraduate research skills and is enhancing the mining sectors research and development capabilities through the Mining Phakisa initiative (Davenport, 2015).

In contrast to the CDE's study (Altbeker and Storme, 2013), which suggested that graduate unemployment is a much exaggerated problem in South Africa, 33% of the respondents in this study were unemployed. It must be noted however that Altbeker and Storme (2013) use the term graduate to specifically refer to holders of a bachelor's degree or a higher degree from a university. Wits and the UP

are the two mining schools that offer this programme and graduates from these schools were not included in the study. The UJ will be phasing out the ND and B. Tech programmes from the year 2017 and will offer a 3 year Bachelor of Engineering Technology (B.EngTech) qualification which will have an articulation route to post graduate qualifications. Therefore, this study did not determine whether in the mining industry, a bachelor's degree offers the job seeker an advantage over the holder of a diploma. However, generally the engineering profession requires more technologists than engineers and UJ is the only institution that graduates technologists.

***Reason why Currently Unemployed***

The majority of the unemployed respondents (63%) perceived a lack of employment opportunities in their field of study as the primary reason for unemployment. Other reasons were a lack of required work experience (31%) and a lack of employment opportunities in any other field of work (6%).

The mining industry has been on the down side since 2008's recession, with a decline observed in the mineral price index. Mining companies that have adopted a cost-cutting strategy have reduced their labour requirements by re-structuring their operations. This has led to fewer openings for recent mining graduates as well.

First-time job seekers are often confronted with the dilemma of a lack of work experience i.e. to find work they need work experience but to get work experience they need to find work. This paradox often leaves the first-time job seeker frustrated. Interventions by government organisations such as the Mining Qualification Authority (MQA) to ensure that the mining and minerals sector has sufficient competent people are useful in addressing this issue. In the year 2014-2015 the MQA reported an increase in the placement of graduates through the internships project, with 699 graduates (mining and related fields) being placed in different mining companies to gain work experience compared with the target of 400 (Mining Qualifications Authority, 2015).

***Period of seeking work before appointment***

Respondents were asked to indicate the number of months it took them to find employment (from the time that they started to seek employment). The information in Tavle IV was obtained.

*Table IV. Time taken to find employment.*

| **Time** | **All** | |
|---|---|---|
| | **Number of respondents** | **%** |
| 0 - 3 months | 4 | 21 |
| 4 - 6 months | 6 | 32 |
| 7 - 9 months | 1 | 5 |
| 10 - 12 months | 2 | 10 |
| Between 12 and 18 months | 3 | 16 |
| More than 18 months | 3 | 16 |
| **Total** | **19*** | **100** |

* Not all respondents completed this question

The cumulative percentage of graduates who found employment in each time period is depicted graphically in Figure 4.


*Figure 4. Time taken to find employment.*

The data shows that more than 50% of respondents seeking employment were placed within the first 6 months after starting their search, and just under 70% were in employment within one year. When the graduates complete their studies and find themselves without work, they have to move back to their homes which is often far from the labour seeking areas. Moleke (2005) states that one of the factors that influence the employment outlook of graduates is the ability to connect with job openings. Graduates used the following methods to seek employment:

- Internet search
- Online applications
- Online agencies
- Sending e-mails and calling companies
- LinkedIn site
- Newspaper posts
- Walk-ins.

It appears that graduates will explore various avenues to find employment, though predominantly the internet. This a challenge to those graduates that have limited or no access to the internet at home and will likely increase the time it takes to find employment. Through initiatives driven by the Young Professionals Council (YPC) of the Southern African Institute of Mining and Metallurgy (SAIMM), the SAIMM is contributing in assisting new graduates to make connections with job openings.

***Summary of Experience after Graduation***

The following information was extracted from the responses of graduates on their employment and employment-seeking experiences after completing their studies:

- The majority of graduates are in employment;
- The main reasons why some graduates are unemployed are the lack of employment opportunities in their field of study, and their lack of work experience;
- On average, 68% of the graduates were in employment within 12 months of seeking employment.

## CONCLUSIONS

This study indicated that one-third of mining graduates from UJ in South Africa are unemployed. The graduates perceive the lack of employment opportunities in their field of study as the main reason for this. However, 68% of the graduates were in employment within 12 months of seeking employment, and over 80% were in employment within 18 months. The various mining sector stakeholders must work together to develop a youth employment strategy that will ensure that vital technical skills are nurtured for the South African mining industry. Mining is a cyclical business and the various stakeholders need to develop graduates to meet current and future industry needs.

## REFERENCES


African Union Commission. (2015). Agenda 2063 Framework Document: The Africa We Want. Addis Ababa. http://agenda2063.au.int/en/sites/default/files/Final Draft Agenda 2063 Framework - Formatted TOC-1.pdf [accessed 26 October 2016].

Altbeker, A. and Storme, E. (2013). Graduate unemployment in South Africa. A much exaggerated problem. *CDE Insight*, April, 17.

Baldry, K. (2013). Graduate unemployment in South Africa: Prevalence, characteristics and perceived causes. MA dissertation, University of the Witwatersrand. http://wiredspace.wits.ac.za/bitstream/handle/10539/13571/Kim Baldry_MA research report_final.pdf?sequence=3 [accessed 25 August 2016].

Van Broekhuizen, H. and van der Berg, S. (2013). How high is graduate unemployment in South Africa? A much-needed update. http://www.econ3x3.org/article/how-high-graduate-unemployment-south-africa-much-needed-update

Chamber of Mines. (2015). Integrated Annual Review 2015. Johannesburg

Davenport. J. (2015). Mining-school enrolment still high despite industry's contraction. Creamer Media. http://www.engineeringnews.co.za/article/mining-school-enrolment-still-high-despite-industrys-contraction-2015-10-09 [Accessed 20 May 2016].

International Labour Organization. (2015). World employment and social outlook – trends 2015. Geneva. http://www.ilo.org/wcmsp5/groups/public/@dgreports/@dcomm/@publ/documents/publication/wcms_337069.pdf [Accessed 14 May 2016].

Letseka, M., Cosser, M., Breier, M. and Visser, M., 2010. *Student retention & graduate destination: higher education & labour market access & success.* Cape Town: HSRC Press URI: http://hdl.handle.net/20.500.11910/4388.

Mayer, M.J. (2011). Towards a youth employment strategy for South Africa., Midrand.

Mining Qualifications Authority. (2015). Annual Report 2014 -2015. http://www.mqa.org.za/sites/default/files/MQA Annual Report 2015.pdf [accessed 11 October 2016].

Moleke, P. (2005). *Finding Work: Employment Experiences of South African Graduates.* HSRC Press, Cape Town. http://www.hsrcpress.ac.za/product.php?productid=2108

Musingwini, C., Cruise, J.A., and Phillips, H.R. (2012). A perspective on the supply and utilization of mining graduates in the South African context. *Platinum 2012. Proceedings of the Fifth International Platinum Conference,* Sun City, South Africa, 19-21 September 2012. Southern African Institute of Mining and Metallurgy, Johannesburg. pp. 937–952. http://www.platinum.org.za/Pt2012/Papers/937-952_Musingwini.pdf [accessed 26 May 2016].

National Planning Commission (2011). National Development Plan: Vision 2030. National Planning Commission : The Presidency, Republic of South Africa Available at: http://www.gov.za/sites/www.gov.za/files/devplan_2.pdf [Accessed 20 May 2016].

Pauw, K., Bhorat, H., Goga, S., Ncube, L., and van der Westhuizen, C. (2006). Graduate unemployment in the context of skills shortages, education and training: findings from a firm survey. Development Policy Research Unit, University of Cape Town. http://ssrn.com/abstract=961353

Phillips, H.R. (2015). Journal comment. *Journal of the Southern African Institute of Mining and Metallurgy*, (April), 2015.

Rupprecht, S., Mmola, T., and Dougall, A. (2015). The young South African mining engineer in the 21st century. University of Johannesburg. https://www.researchgate.net/profile/Andre_Dougall/publication/277167281_The_Young_South_African_Mining_Engineer_in_the_21st_Century_Steven_Rupprecht_Tshepo_Mmola_and_Andre_Dougall/links/55642bcf08ae8c0cab37003e

Soko, M. and Balchin, N., 2014. Breaking the deadlock: Tackling the South African labour market crisis. *GSB Business Review Online*, Available at: http://www.gsbbusinessreview.gsb.uct.ac.za/breaking-the-deadlock-tackling-the-south-african-labour-market-crisis/ [Accessed August 6, 2016].

Stacey, T.R., Hadjigeorgiou, J., and Potvin, Y. (2009). Technical skills – a major strategic issue. *Journal of the Southern African Institute of Mining and Metallurgy*, 109 (4), 245–252. http://www.scielo.org.za/pdf/jsaimm/v109n4/07.pdf [accessed 6 August 2016].

StatsSA. (2008). National and provincial labour market: youth. Pretoria. http://www.statssa.gov.za/publications/P02114.2/P02114.22015.pdf [accessed 26 October 2016].

Van der Merwe, J.N. (2011). Future of the South African mining industry and the roles of the SAIMM and the universities. *Journal of the Southern African Institute of Mining and Metallurgy*, 111 (September), 581–592. http://www.scielo.org.za/pdf/jsaimm/v111n9/a01v111n9.pdf [accessed 11 October 2016].

**Tshepo Matsape Mmola**

Lecturer
University of Johannesburg

- Lecturer – University of Johannesburg (2014 – present)
- MIT – Murray & Roberts Cementation (2008-2013)